REMARKS

Applicants request reconsideration of the rejections set forth in the previous office action since the Examiner did not address applicants' previous arguments related to some of the references of record and applied them in the same manner without addressing applicants' arguments. Applicants respectfully submit that the Examiner's broad statement that "Applicant's arguments with respect to claims 1-13 have been considered by are moot in view of the new ground(s) of rejection." should not apply to references such as Miyazaki et al. and Le which were incorrectly applied again in the final office action and applicant had presented basic arguments as to why these references could not be combined to reject the claims.

Applicants also request reconsideration of the reference combination applied in the rejections of the independent claims since these claims recite elements covered by 35 USC 112, sixth paragraph and thus the independent claims must be construed to cover the corresponding structure, material, or acts in the specification and equivalents thereof and the applied references do not show these features.

Claims 1 and 6 were rejected under 35 USC 103(a) as being unpatentable over Nagayama et al. (U.S. Patent No. 6,008,616) in view of Kuznetsov (U.S. Patent No. 4,489,265).

The Examiner stated that Nagayama et al. disclosed a system having an induction machine, having an inverter 40 being connected to the induction machine 50, which is used for controlling the inverter and the poles can be changed to obtain a plurality of pole combination. The Examiner admitted that Nagayama et al. do not disclose using pole phase modulation, even though they teach that it is known to change the pole combinations of electrical machines.

The Examiner believed that Kuznetsov disclosed that induction machines may use pole phase modulation, and that a cage rotor may be used. The Examiner also believed that it would have been obvious to design a system using an induction machine disclosed by Nagayama et al. and to explicitly disclose using pole phase modulation for the purpose of utilizing the entire periphery for speed control applications without the necessity for large dead zone as disclosed by Kuznetsov.

Applicants respectfully traverse this rejection since the construction of claim 1 is covered by 35 USC 112, sixth paragraph, and Kuznetsov, while mentioning the same word "pole phase

modulation" in his patent, cannot be applied as teaching the phrase "means for operating said induction machine using pole phase modulation to change the number of stator and rotor poles to a plurality of pole combinations" since this means plus function language must be interpreted in accordance with the corresponding structure, material, or acts in the specification and equivalents thereof. Applicants respectfully submit that Kuznetsov cannot be interpreted in such a manner.

Applicants respectfully submit that the language "means for operating the induction machine using pole phase modulation to change the number of stator and rotor poles to a plurality of pole combinations" invokes 35 USC 112, sixth paragraph because it meets the 3-prong test specified in MPEP Section 2181, titled LANGUAGE FALLING WITHIN 35 USC 112 SIXTH PARAGRAPH. The Examiner is requested to review MPEP Section 2181 for the standards for rejecting these means plus function claims.

35 USC 112, sixth paragraph provides that an element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts in the specification and equivalents thereof.

As discussed in the application, pole phase modulation (PPM) of the present invention is a specific type of control for an induction machine. It does not mean the "pole phase modulation" used by Kuznetsov.

The PPM implementation of the present invention is described throughout the specification including pages 1-3. In pole phase modulation, the pole counts p2:p1 are completely arbitrary and this is therefore the most general case of pole changing. The present invention is not locked into any slot number or coil pitch ratios that all of the other methods are forced to use.

This feature is not shown or suggested by any of the prior art references of record.

Nagayama et al. disclose an induction machine 50 that changes the number of poles 2n (n = 2, 4, --). However, Nagayama et al. do not disclose an induction machine using pole change modulation to change the number of stator and rotor poles to an arbitrary number of pole combinations.

Kuznetsov relates to a system that uses pole amplitude modulation (PAM). PAM is a fixed ratio method. Also, the PAM technique cannot achieve the vast number of arbitrary ratios of pole changes. While Kuznetsov mentions using "pole phase modulation", this is the same name for a different technique.

Therefore, Kuznetsov should not be applied to the current claims which are defined in means plus function language because this language must be interpreted based on the present application's description to cover the corresponding structure, material, or acts in the specification and equivalents thereof.

Thus, Nagayama et al. and Kuznetsov do not teach or suggest a programmable microprocessor with a means for operating the induction machine using pole phase modulation to change the number of stator and rotor poles to a plurality of pole combinations.

Applicants respectfully submit that one of ordinary skill in the art would not have combined Nagayama et al. with Kuznetsov to achieve the invention claimed in claim 1 when it is properly construed according to 35 USC 112, sixth paragraph.

Applicants also respectfully submit that there is no teaching in either reference for such a combination. It is therefore submitted that claims 1 and 6 are allowable over the prior art of record.

Claims 2-4 and 9 were rejected under 35 USC 103(a) as being obvious over Nagayama et al. and Kuznetsov and in view of Miyazaki et al. (U.S. Patent No. 5,994,881). The Examiner admitted that the combined system of Nagayama et al. and Kuznetsov did not disclose using vector control. The Examiner believed that

Miyazaki et al. disclosed using vector control for the purpose of minimizing the cost of generators and effectively determining the position of the poles as shown in Fig. 1A and 1B.

This rejection is respectfully traversed for the reasons set forth above in connection with claim 1 and the following remarks.

Since claims 2-4 and 9 depend directly or indirectly from claim 1 and further limit claim 1, these claims are all allowable for the reasons set forth in connection with claim 1.

Furthermore, Miyazaki et al. discloses a synchronous generator only. Miyazaki et al. do not make up the deficiency in the combination of Nagayama et al. and Kuznetsov. These synchronous generators are controlled differently than induction generators as is well known in the art. It is also well known that these two machines require two different types of control. Also, there is no teaching or suggestion for such a combination of references. Thus, one of ordinary skill in the art would not combine a vector control from a synchronous generator into the induction machines of Nagayama et al. and Kuznetsov. It is therefore respectfully requested that this rejection be withdrawn. Applicants also previously presented this argument and request that the Examiner address this issue if he wishes to maintain this rejection.

It is therefore submitted that claims 2-4 and 9 are also allowable over the prior art of record.

Claim 8 and 10 were rejected under 35 USC 103(a) as being obvious over Nagayama et al. and Kuznetsov and in view of Le (U.S. Patent No. 5,350,988). The Examiner stated that the combined system of Nagayama et al. and Kuznetsov did not disclose using a digital signal processor. The Examiner stated that Le disclosed a digital signal processor 70 for the purpose of providing precise synchronized control in an electrical machine. The Examiner believed that it would have been obvious to use the DSP in the electrical machine of Le in the combined system of Nagayama et al. and Kuznetsov.

This rejection is respectfully traversed in view of the comments above related to claim 1 and the following remarks.

Le discloses digital control of a brushless DC Motor (BDCM) that is typically a permanent magnet synchronous machine having distinct, fixed number of permanent magnet poles on the rotor. Le describes control for the brushless motor, as stated in column 1, lines 10-13, lines 66-67 and claims 1 and 14. In Le, the phase number is restricted to 3, as is typical of the state of the art. Le cannot operate his machine using pole phase modulation.

Le, like Miyazaki, discloses a synchronous generator which is controlled differently than the induction machines claimed in the present invention. As described above, one of ordinary skill in the art would not combine a control from a synchronous generator into the induction machines of Nagayama et al. and Kuznetsov. Also, there is no teaching or suggestion for such a combination of references. It is therefore respectfully requested that this rejection be withdrawn. Applicants also previously presented this argument and request that the Examiner address this issue if he wishes to maintain this rejection.

It is therefore submitted that this rejection has been overcome and should be withdrawn.

Claims 5 and 7 were rejected under 35 USC 103(a) as being obvious over Nagayama et al. and Kuznetsov in view of Miller et al. (U.S. Patent No. 5,977,679). The Examiner admitted that the combined system of Nagayama et al. and Kuznetsov did not disclose using a toroidally wound stator. The Examiner stated that Miller et al. disclosed for the purpose of promoting heat dissipation, a toroidally wound stator in Fig. 1.

This rejection is respectfully traversed in view of the comments made above in connection with the independent claim and the following remarks.

As stated above in connection with claim 1, Nagayama et al. and Kuznetsov do not teach or suggest a programmable microprocessor with a means for operating the induction machine using pole phase modulation to change the number of stator and rotor poles to a plurality of pole combinations. Therefore, although Miller discloses a toroidally wound stator, Miller does not make up for the deficiencies in the combination of Nagayama et al and Kuznetsov. Furthermore, Miller and the other applied references do not teach or suggest how or why one of ordinary skill in the art would combine these references in the manner suggested by the Examiner.

Thus, Nagayama et al., Kuznetsov and Miller, individually or in combination, do not teach or suggest a system including a programmable microprocessor with a means for operating the induction machine using pole phase modulation to change the number of stator and rotor poles to a plurality of pole combinations. It is therefore respectfully submitted that this rejection has been overcome and should be withdrawn.

It is also submitted that claims 5 and 7 are allowable over the prior art of record.

Claims 11 and 12 were rejected under 35 USC 103(a) as being obvious over Nagayama et al. and Kuznetsov in view of Miyazaki et al. and Le.

The Examiner stated that the combined system discloses all of the elements above. Examiner also stated that the combined system does not disclose using a digital signal processor and using vector control, and that Miyazaki et al. disclose for the purpose of minimizing the cost of generators and effectively determining the position of the pole that a generator may be controlled using vector control. The Examiner further stated that neither Nagayama nor Miyazaki discloses a position sensor, and that Le discloses for the purpose of providing precise synchronized control in an electrical machine, a digital signal processor. The Examiner further stated that Le discloses and teaches that it is known to use sensors for providing a position indicative of the rotor and the stator. The Examiner concluded that it would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined system as disclosed above and to modify the invention by using vector control for the purpose of minimizing the cost of generators and effectively determined the position of poles as disclosed by Miyazaki et al.

and to use a position sensor for the purpose of providing precise synchronized control in an electrical machine as disclosed by Le.

This rejection is respectfully traversed in view of the comments above related claim 1 as the same language is present in claim 11 and the following remarks.

Independent claim 11 recites a programmable microprocessor which includes a means for controlling said inverter so that the induction machine operates with pole phase modulation to change the number of stator and rotor poles to a plurality of pole combinations.

Claim 11, like claim 1, invokes 35 USC 112 sixth paragraph because the claim includes means plus function language. As discussed above in connection with claim 1, Nagayama et al. and Kuznetsov do not teach or suggest "a programmable microprocessor with a means for operating the induction machine using pole phase modulation to change the number of stator and rotor poles to a plurality of pole combinations" when construed according to 35 USC 112, sixth paragraph. Furthermore, Miyazaki and Le do not make up for the deficiencies in the combination of these cited references for the reasons give above.

It is therefore respectfully submitted that this rejection has been overcome and should be withdrawn.

It is also submitted that claims 11 and 12 are allowable over the prior art of record.

Claims 13 was rejected under 35 USC 103(a) as being obvious over Nagayama et al. and Kuznetsov, Miyazaki and Le in view of Miller et al.

The Examiner stated that the combined system discloses all of the elements above. Examiner also stated that the combined system does not disclose using a toroidally wound stator. The Examiner further stated that Miller et al. discloses for the purpose of promoting heat dissipation, a toroidally wound stator and that it would have been obvious to one having an ordinary skill in the art at the time the invention was made to design the combined system as disclosed above and to use a toroidally wound stator for the purpose of promoting heat dissipation as disclosed by Miller et al.

This rejection is respectfully traversed in view of the comments above including those related to the means plus function language and the following remarks.

Since claim 13 depends from claim 11, it is allowable for the same reasons as claim 11. Also, applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to combine Nagayama et al., Kuznetsov, Miyazaki

et al. and Le into a system as defined in claim 13. Furthermore, Miller et al. do not make up for the deficiencies in the combination of these references.

It is therefore respectfully submitted that this rejection has been overcome and should be withdrawn. Thus, it is submitted that claims 13 is allowable over the prior art of record

In summary, applicants respectfully submit that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding this application, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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